KSC ISS / Payloads Processing Directorate

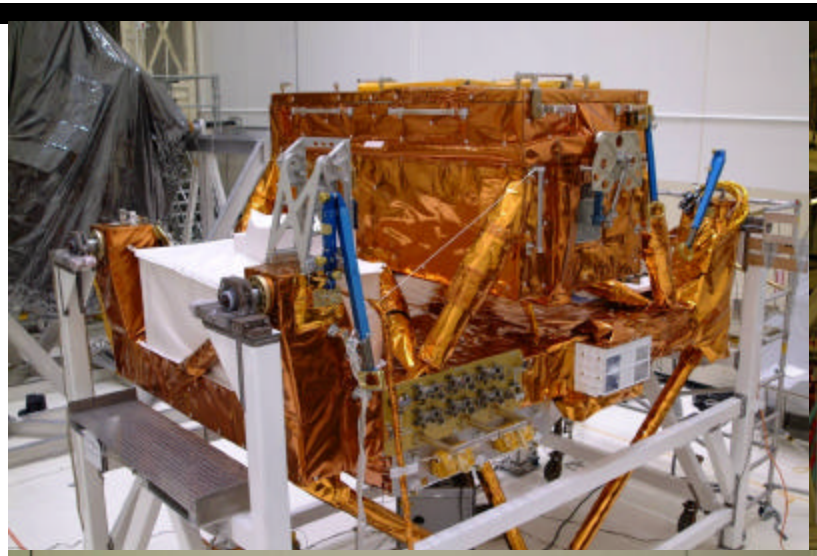
Hubble Space Telescope
Servicing Mission - 3B

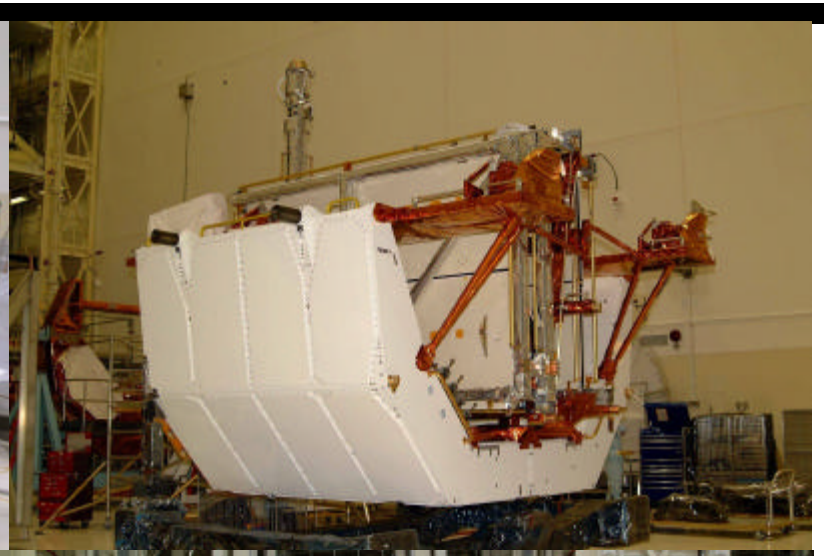
Agenda

• Acronyms	In Back-Up
• Hardware Images	To Be Briefed
• Special Topic: Potential RWA R&R	To Be Briefed
• Processing Milestones	To Be Briefed
• Master Milestone Schedule	In Back-Up
• Middeck Experiment Requirements	None
• Launch Delay Requirements	To Be Briefed
• Engineering Status	To Be Briefed
• Readiness Certification	To Be Briefed

HST Servicing Mission – 3B Carriers

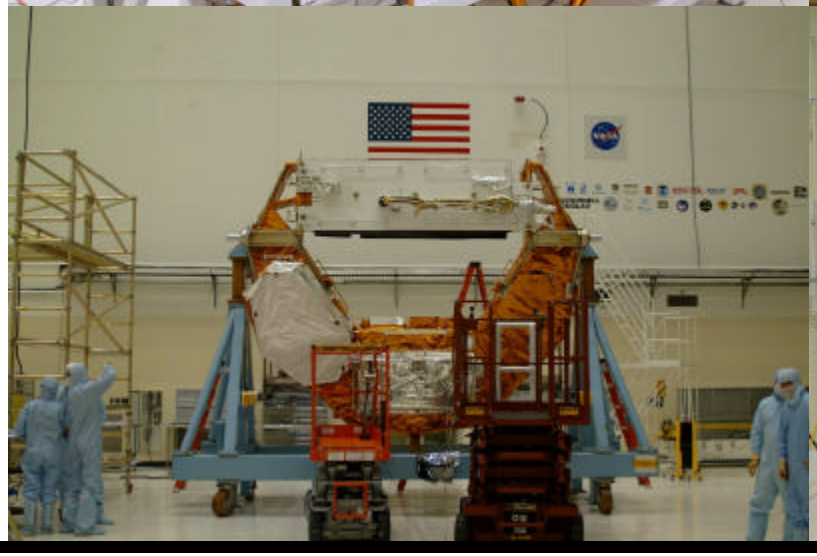
RAC

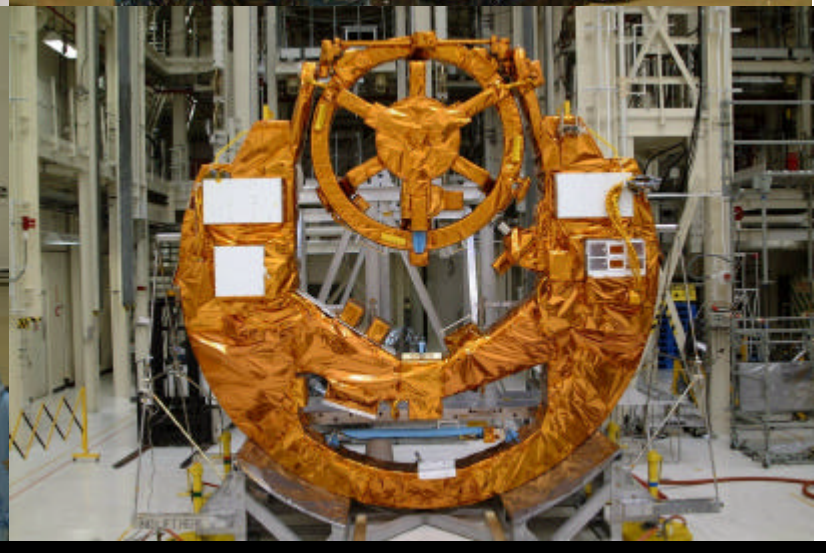




SAC

MULE

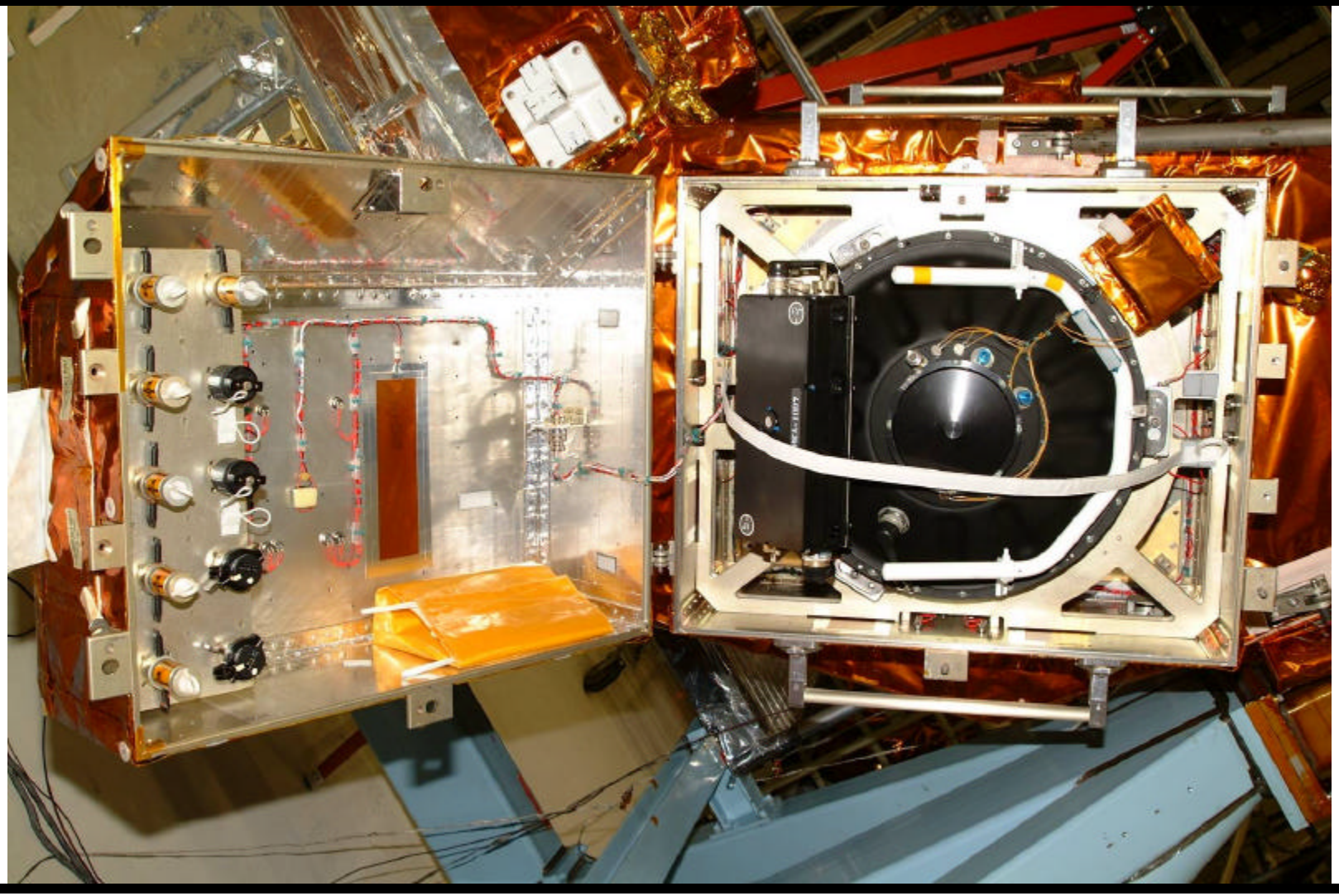




FSS

Advanced Camera for Surveys

Reaction Wheel Assembly in Large ORU Protective Enclosure



Special Topic: Potential RWA Removal and Replacement

- In December 2001, as a result of an on-orbit problem, the HST Project decided to fly a replacement RWA on this mission
- RWA s/n 1007 was delivered to KSC and installed into the LOPE on the MULE in late January 2002
- On 11 February, the HST Project determined that RWA s/n 1007 might be suspect and immediately began final testing / preparations of RWA s/n 1009
- A decision as to whether an RWA swap is required is expected by 15 February
- RWA s/n 1009 should arrive at KSC on 16 February, ready for installation
- While it is preferable to perform the swap while the MULE is on the floor in the VPF, it is possible to perform this task while the MULE is in the PGHM at the Pad
- Removal and replacement has been tentatively scheduled for second shift on 16 February
- No acceptable technique has been developed for performing an RWA swap after payload installation into the Orbiter

Processing Milestones

VPF

● MULE, RAC, and SAC On Dock	19 October	(A)
● End-To-End / PI Characterization Test (OPF)	24 October	(A)
● FSS On Dock	8 November	(A)
● ACS On Dock (Hangar AE)	28 November	(A)
● CITE Interface Verification Test	10 December	(A)
● FSS Pivitor FDA Test (CITE)	17 December	(A)
● ACS Transfer to VPF	18 December	(A)
● ACS Integration into SAC	20 December	(A)
● NCC On Dock / Integration into SAC	17 January	(A)
● NCC Vacuum Pumping – Phase 1	17 January - 14 February	
● NCS Radiator Integration onto Mule	22 January	(A)
● Crew Familiarization	22 - 23 January	(A)
● RWA and LOPE On Dock	29 January	(A)
● RWA and LOPE Integration onto MULE	29 - 31 January	(A)
● FSS and RAC Into Canister	11 February	(A)
● MULE and SAC into Canister / Rotate to Vertical	14 February	

Processing Milestones

Pad A

● Space Shuttle Vehicle Transfer to Pad	28 January	(A)
● Payload Bay Highly Sensitive Cleaning	30 Jan. – 4 Feb.	(A)
● HST SM-3B Transfer to Pad	15 February	
● RWA Removal / Replacement	16 February	(U/R)
● Install HST SM-3B into Orbiter	17 February	
● NCC Vacuum Pumping - Phase 2	18 - 19 February	
● HST SM-3B to Orbiter Electrical / GN2 Mates	18 - 19 February	
● SSV Ordnance Connects / Hyper Press. (Pad Clear)	20 February	
● NCC Vacuum Pumping - Phase 3	21 - 25 February	
● HST SM-3B Interface Verification Test	21 February	
● HST SM-3B End-To-End Test	22 February	
● Payload Bay Closeouts	23 - 25 February	
● Final Flight Crew Payload Bay Walkdown	25 February	
● HST SM-3B Middeck Hardware Stow	25 February	
● Close Payload Bay Doors For Flight	25 February	
● Launch	28 February	

Launch Delay Requirements

NICMOS Cryo-Cooler (Payload Bay)

- Vacuum pumping must be reinitiated within 14 days of last access (L-66 hours)
- Based on the effectiveness of pre-launch vacuum pumping operations, the HST project may extend the 14 day limit up to a maximum of 21 days – A decision in this regard is expected a few days prior to the initial launch attempt
- If the limit is reached, a minimum of 36 hours of continuous access to the NCC must be provided prior to the next launch attempt

Power Ratchet Tool Batteries (Middeck)

- Batteries must be removed and replaced within 45 days of turnover
- Turnover is scheduled to occur at L-3 days (2/25)

Engineering Status

OMRSD

- No pending changes
- No open Waivers or Exceptions
- A review of the Requirements Allocation Matrix has confirmed that all remaining open requirements have been incorporated into the appropriate scheduled procedures for satisfaction

Nonconformances

- All Problem Reports have been closed
- No Unexplained Anomalies

Procedures

- All payload processing procedures have been released

Launch Commit Criteria

- None

Certificate of Flight Readiness

- No Exceptions

Readiness Certification

Pending successful completion of the remaining scheduled Pad operations, the KSC ISS / Payloads Processing Directorate is ready to proceed with launch of HST SM-3B / STS-109.

KSC ISS / Payloads Processing Directorate
Back-Up Material

Acronyms

- ACS — Advanced Camera for Surveys
- CITE — Cargo Integrated Test Equipment
- FDA — Failure Detection Annunciator
- FSS — Flight Support System
- IVT — Interface Verification Test
- LOPE — Large Orbital Replacement Unit Protective Enclosure
- MULE — Multi-Use Lightweight Equipment
- NCC — NICMOS Cryo-Cooler
- NCS — NICMOS Cooling System
- PI — Payload Interrogator
- RAC — Rigid Array Carrier
- RWA — Reaction Wheel Assembly
- SAC — Second Axial Carrier
- SSV — Space Shuttle Vehicle
- VPF — Vertical Processing Facility

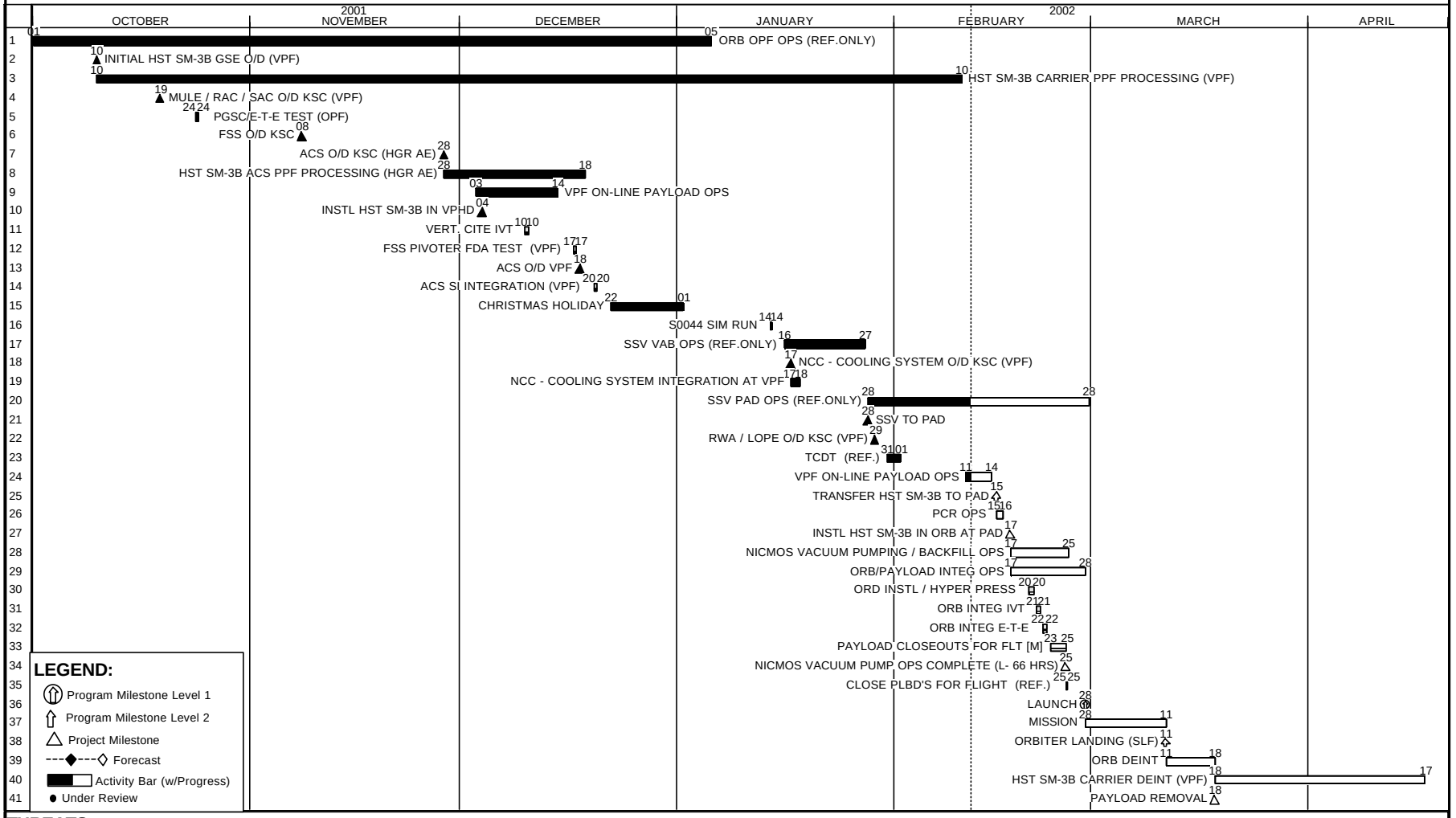
STS-109 HST SM-3B
MASTER MILESTONE SCHEDULE
EXPANDED FLOW

OPF BAY: 1 / 3 PAD: A ORBITER: Columbia / OV-102

MANIFEST: REF. SSP S042013CD STATUS AS OF: 12 FEB 2002 REV: P

NASA: S. HIGGINBOTHAM

BOEING PGOC: B. HART



THREATS: